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VASCULAR FLORA OF MOMENCE WETLANDS, KANKAKEE COUNTY, ILLINOIS

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ABSTRACT

The vascular flora of Momence Wetlands, Kankakee County, Illinois, was studied during the 1998 - 1999 growing seasons. A total of 385 taxa were found: 6 ferns and fern-allies, 89 monocots, and 290 dicots. Families with the largest number of taxa included Asteraceae with 59 taxa, Poaceae with 44 taxa, and Cyperaceae with 26 taxa, of which 17 were members of the genus *Carex*. This is the northern most location in Illinois for four taxa generally associated with swamps in southern Illinois, *Populus heterophylla* L. (swamp cottonwood), *Fraxinus profunda* (Bush) Bush (pumpkin ash), *Mikania scandens* (L.) Willd. (climbing hempweed), and the state threatened *Styrax americana* Lam. (American storax). Three forest communities (wet floodplain, wet-mesic floodplain, dry-mesic upland) were surveyed, and density (stems/ha), basal area (m^2/ha), importance value, and average diameter were determined for each overstory species. Wet floodplain forest was dominated by *Acer saccharinum* L. (silver maple); wet-mesic floodplain forest by *Quercus bicolor* Willd. (swamp white oak), *Quercus palustris* Muenchh. (pin oak), *Ulmus americana* L. (American elm), and *Fraxinus pennsylvanica* Marsh. (red/green ash); and dry-mesic upland forest by *Quercus velutina* Lam. (black oak) and *Quercus alba* L. (white oak). A wet-mesic prairie remnant dominated by *Rubus flagellaris* Willd.(Northern dewberry), *Helianthus mollis* Lam. (downy sunflower), *Andropogon gerardii* Vitman (big bluestem), and *Solidago canadensis* L. (tall goldenrod) was also surveyed.

INTRODUCTION

Momence Wetlands (MW) study area is comprised of two sites, Momence Wetlands Nature Preserve (MWNP) and Momence Wetlands Land and Water Reserve (MWLWR). MW is located in eastern Kankakee County, Illinois in and along the

Kankakee River within three miles of the Illinois/Indiana border. MWNP and MWLWR are owned by the Illinois Department of Natural Resources. The MWNP is located 5 miles east of Momence, Illinois, in a bend of the Kankakee River channel (T 31N, R 14E, SE1/4 Section 13 and NE1/4 Section 24). This preserve, 29.2 ha (72 ac) in size, contains the best remaining example of wet-mesic floodplain forest in the Kankakee River drainage. MWLWR, 210.2 ha (519 ac) in size, is located in and along the Kankakee River about 1.5 mile west of MWNP (T 31N, R 14E, S1/2 S15, S1/2 Section 16, NE1/4 S16, NE1/4 S21 and N1/2 Section 22). No previous studies have been published on the vascular flora of these areas.

MWNP was dedicated as a nature preserve in 1988, and MWLWR was registered as a Land and Water Reserve in 1998 (Horn 1998). Although subjected to some disturbances, particularly logging (some within the past 15 years), both areas have a relatively high diversity of plant and animal life. This study was undertaken to document the vascular flora of MWNP and MWLWR and to determine composition and structure of the natural plant communities.

The study areas are nearly level and small changes in elevation are responsible for dramatic changes in species composition and forest structure. Within MW study area, there are extensive low depressions (sloughs) created by naturally cut-off river channels, wet floodplains, wet-mesic floodplains that are <1 m above the wet floodplains, and high upland terraces that are only 3 to 5 m above the wet floodplains. Elevation varies from 188 m above sea level at the rivers edge to 194 m above sea level on the high terraces.

MATERIALS AND METHODS

At various times throughout the growing seasons, from mid-summer of 1998 through late fall of 1999, field trips were made to the MW. During each trip voucher

specimens were collected, habitat data for each taxon determined, and plant communities delineated. The material collected was identified and deposited in the herbarium of the Illinois Natural History Survey (ILLS), Champaign, Illinois. Criteria for designating native and non-native taxa followed Fernald (1950), Steyermark (1963), Mohlenbrock (1986), and Gleason and Cronquist (1991).

During the summer of 1998, a 3.125 ha (125 m x 250 m) section was located within the wet-mesic floodplain forest community at the MWNP, and a 1 ha (100 m x 100 m) section was located in each of the three forest communities at the MWLWR (wet floodplain forest, wet-mesic floodplain forest, and dry-mesic upland forest). Each section was divided into 25 m x 25 m quadrats for ease in sampling the woody overstory. In each quadrat, all living and dead-standing woody individuals 10 cm dbh (diameter at breast height, 1.4 meter above the ground) and above were identified and their diameters recorded. From these data, density (stems/ha), basal area (m^2/ha), relative density, relative dominance, importance value (IV), and average diameter (cm) were calculated for each species. Determination of the IV follows the procedure used by McIntosh (1957), and is the sum of the relative density and relative dominance of a given species. Density (stems/ha) of woody understory species was determined using 10 to 20 nested circular plots (0.0001, 0.001, and 0.01 ha) per section, randomly located along transects through the study areas. Four additional 0.0001 ha circular plots were located 6 m from each center along the cardinal compass directions. In 0.0001 ha plots tree seedlings ($\leq$50 cm tall) and all shrubs were counted. In 0.001 ha circular plots small saplings (>50 cm tall and <2.5 cm dbh) were counted, and in 0.01 ha circular plots large saplings (2.5-9.9 cm dbh) were counted. Nomenclature follows Mohlenbrock (1986) and/or Gleason and Cronquist (1991).

Ground layer species (including woody species <1.5 m tall) of the small wet-mesic prairie remnant and an adjacent successional field with some prairie species were analyzed using 0.5 m x 0.5 m quadrats located at each meter mark along an east/west

50 m transect. Quadrats were located right (odd-numbered meters) or left (even-numbered meters) from the transect; distance was determined using a random numbers table (single digit). The cover of each species rooted in a quadrat was determined using Daubenmire (1959) cover classes as modified by Bailey and Poulton (1968). The midpoint of each cover class will be used to determine the cover of each occurrence (class 1 = 0 to 1% with a midpoint of 0.5%, class 2 = >1 to 5% with a midpoint of 3.0%, class 3 = >5 to 25% with a midpoint of 15.0%, class 4 = >25 to 50% with a midpoint of 37.5%, class 5 = >50 to 75% with a midpoint of 62.5%, class 6 = >75 to 95% with a midpoint of 85.0%, class 7 = >95 to 100% with a midpoint of 97.5%). From these data, cover (%), relative cover, frequency (%), relative frequency, and importance value of each species were calculated.

The Floristic Quality Index (FQI) was determined for the nature preserve (MWNP) and each natural community using the Coefficient of Conservation (C) assigned to each species by Taft, et al. (1997). The Index provides a measure of the floristic integrity or level of disturbance of a site. As used here, the FQI is a weighted index of species richness (N), and is the arithmetic product of the mean C, multiplied by the square-root of the species richness (N) of an inventory site [FQI = mean C(N)].

DESCRIPTION OF THE STUDY AREA

The study areas are within the Kankakee Sand Area Section of the Grand Prairie Division (Schwegman et al. 1973). The Kankakee Sand Area Section was formed approximately 14,000 years ago during the Kankakee Flood when incising of the Illinois River Valley drained the large glacial lakes of this area (William and Frye 1970). The MW are in and along the Kankakee River, a slow naturally meandering river that dissects part of the Wisconsin Till Plain, and drains about 721,062 ha

(1,780,400 ac) of land in Illinois and adjacent northwestern Indiana (Suloway and Hubbell 1994, Indiana Division of Water personal communication). The 1,010 ha (2,500 ac) MW complex is the last vestige of the Grand Kankakee Marsh in Illinois. The Grand Kankakee Marsh once encompassed nearly 403,715 ha (1,000,000 ac) extending on both sides of the Kankakee River in Illinois and Indiana (Bridges 1934). The six mile stretch of the Kankakee River from Momence, Illinois, to the Indiana state line, is the most natural segment of the Kankakee valley that remains (Horn 1998). Here, the MW are recognized by the Biological Stream Characterization (BSC) as one of Illinois' finest water resources and contains outstanding biological features. Also, the Illinois Natural Areas Inventory (INAI) identified the Kankakee River as a high quality system. The soils of the study areas are alluvial deposits, primarily Gilford fine sandy loam, wet. This soil is found in areas which are nearly level to depressional and subject to frequent flooding or ponding (Paschke 1979).

Here, the presettlement vegetation in and along much of the Kankakee River (figure 1) was mostly wet to wet-mesic forests, though wet prairie was also present. Characteristic sand savanna and sand prairie vegetation prevailed on higher sandy areas (King 1981). The Kankakee River traversed east/west through the center of Momence Township (T 31N, R 14E) and contained numerous islands.

About half of the Government Land Office survey notes are not legible for the study areas (Public Land Survey 1834). However, enough can be read to give a fairly good idea of the vegetation of this area. South of the river was mostly "level wet prairie unfit for cultivation" and extensive shallow ponds that were rarely more than a few feet deep. A small forested area, less than one square mile in size and dominated by black and white oaks, occurred on slightly higher ground near the rivers edge. The islands were described as being mostly covered with water and "thickly set with swamp [probably silver] maple and birch"; *Quercus macrocarpa* Michaux (bur oak) and ash were occasionally mentioned, as was spice [probably *Lindera benzoin* (L.) Bush

(spicebush)] in the understory. The land at the rivers edge was described as "rich bottom too wet for cultivation, subject to occasional inundation of about 4 feet as appears by the water marks on the trees". North of the river, prairie dominated mostly "wet level prairie, soil unfit for cultivation;" some extensive ponds covering more than two square miles were also found, as were higher, dry prairies "fit for cultivation." Forested areas were more common along the northern edge of the river channel and a few groves occurred back from the river. The dominant trees described were black oak, white oak, *Quercus rubra* Lam. (red oak), and bur oak, with no undergrowth other than *Corylus americana* Walt. (hazel) occasionally mentioned.

In this survey, six natural plant communities were recognized within the MW study area. The cultural communities are represented by successional fields, levees, roadsides, and abandoned railroad right-of-ways. Three natural wetland communities are present: a narrow extensive network of shrub swamps/marshes, extensive wet floodplain forest, and less extensive scattered wet-mesic floodplain forest. Two natural upland communities are present: a slightly elevated dry-mesic upland forest bordering the northeast side of MWLWR and a small <1 ha wet-mesic prairie remnant along a railroad right-of-way within the reserve.

The climate of east-central Illinois is continental with cool winters, hot summers, and little or no water deficit in any season of the year (Page 1949, Fehrenbacher et al. 1967, Schwegman et al. 1973). In Lowell, Indiana (19 km to the northeast) mean annual precipitation is 101.7 cm, with the month of April having the highest rainfall (11.4 cm). Mean annual temperature in Lowell is 9.2°C with the hottest month being July (average of 22.6°C) and the coldest January (average of -6.4°C) (Midwestern Climate Center 1999). The number of frost free days is 160 to 170.

RESULTS AND DISCUSSION

Vascular Plant Species Present

The documented flora in the MW consisted of 385 species and subspecific taxa within 243 genera and 87 families. Of these taxa, 58 (15.1%) were not native to Illinois. Pteridophytes were poorly represented at MW, accounting for only 6 taxa (2% of all taxa) while Spermatophytes accounted for the remainder. Among the Spermatophytes, monocots accounted for 89 taxa in 48 genera and 13 families (23% of all taxa), while dicots accounted for 290 taxa in 189 genera and 68 families (75% of all taxa). Genera represented by the most taxa were *Carex* (17), *Polygonum* (10), *Aster* (7), *Panicum* (7), and *Solidago* (6). Families with the most taxa were Asteraceae (59), Poaceae (44), Cyperaceae (26), Lamiaceae (18), Rosaceae (18), Polygonaceae (14), Brassicaceae (12), Caryophyllaceae (11), Apiaceae (10), and Fabaceae (10). For a complete list of taxa see Appendix 1.

Habitat Types Present

Natural plant communities were designated primarily using the community classification of White and Madany (1978) and are outlined in Figures 2 & 3. Most of these communities have been influenced by various disturbances such as flooding, fire, fire suppression, grazing, wildlife activity, such as browsing by *Odocileus virginianus* (white-tailed deer), and past management practices (Ebinger and McClain 1991).

Natural communities recognized at MW:

1. **Shrub swamps/marshes:** This community complex was widely scattered throughout the MW and accounted for 26.0% or 7.6 ha (18.7 ac) of the 29.2 ha (72 ac) MWNP and 15.0% or 31.5 ha (77.7 ac) of the 210.2 ha (519 ac) MWLWR (Figures 2 & 3). It is a narrow community formed within a network of sloughs. This dynamic community may change from year to year as the

water level within the Kankakee River channel changes and new channels are formed and others cut-off. The channels varied greatly in composition; determined at least somewhat by frequency and duration of inundation, with some seasonal changes they included mud flats, herb dominated, shrub dominated, and forested areas. However, the most frequent situation was herb or shrub dominated. Trees were present occasionally and included: silver maple, red/green ash, pin oak, *Betula nigra* L. (river birch), swamp cottonwood, and pumpkin ash. Swamp cottonwood and pumpkin ash were rare at the MW, their most northern vouchered range in Illinois. The dominant shrub was *Cephalanthus occidentalis* L. (buttonbush). Dominant herbs included: *Hibiscus laevis* All. (halberd-leaved rose mallow), *Leersia oryzoides* (L.) Swartz (L.) Swartz (rice cutgrass), *Leersia virginica* Willd. (white grass), *Penthorum sedoides* L. (ditch stonecrop), *Pilea pumila* L. (clearweed), *Polygonum hydropiperoides* Michaux (mild water peper), *Rumex verticillatus* L. (swamp dock), *Sagittaria latifolia* Willd. (common arrowleaf) and *Saururus cernuus* L. (lizard's-tail). One frequent herb was climbing hempweed; this is the most northern vouchered range for this species in Illinois. The floristic integrity, as measured using the FQI of Taft, et al. (1997), was 25.95 for the site; the mean C was 3.08 (Table 1). Only four species were encountered with a C greater than seven: *Azola caroliniana* Willd. (eastern mosquito fern), pumpkin ash, climbing hempweed, and swamp cottonwood. Most of the species had a C from two to five. Seven adventive species were included in calculating the FQI. If these species were excluded from the calculations, the FQI of the site was 27.36 and the mean C was 3.42. For a floodplain community this is a good mean C (above 3.00) and indicates the community has good floristic quality.

2. **Wet floodplain forest:** This community accounted for 40.4% or 11.8 ha (29 ac) of the MWNP and 53.7% or 112.8 ha (278.5 ac) of the MWLWR (Figure 2 and 3). The wet floodplain forest was characterized by frequent flooding during the growing season and a low diversity of woody and herbaceous species (117 species). Silver maple was the dominant tree species. Few woody understory trees and shrubs occurred in the very open understory. Common woody vines included: *Campsis radicans* (L.) Seem (trumpet creeper) and *Toxicodendron radicans* (L.) Kuntze (poison ivy). Herbaceous species included: *Acalypha rhmoboidea* Raf. (three-seeded Mercury), *Aster lanceolatus* Willd. (panicled aster), *Bidens frondosa* L. (common beggar-ticks), *Laportea canadensis* (L.) Wedd. (wood nettle), *Leersia lenticularis* Michaux (catchfly grass), *Lobelia cardinalis* L. (Cardinal flower), clearweed, *Polygonum punctatum* Ell. (smartweed), and lizard's tail. The floristic integrity was 30.83 for the site, while the mean C was 2.85 (Table 1). Only two species were encountered with a C greater than seven: Eastern mosquito fern and climbing hempweed. Most of the species had a C from two to five. Ten adventive species were included in calculating the FQI. If these species were excluded from the calculations, the FQI of the site was 32.17 and the mean C was 3.11.

3. **Wet-mesic floodplain forest:** This community accounted for 33.6% or 9.8 ha (24.3 ac) of the MWNP and 7.7% or 16.1 ha (39.7 ac) of the MWLWR (Figures 2 & 3). The wet-mesic floodplain forest was characterized by flooding during the growing season that is much less frequent and for a much shorter durating than the wet floodplain forest. An obvious feature of this community was the large number of dead-standing trees. The diversity of tree species was greater than the wet floodplain forest with swamp white oak, pin oak, and silver maple the dominant tree species. Woody understory trees and shrubs were

relatively dense with numerous saplings, especially spicebush and red/green ash. American storax, a state threatened shrub, was occasional here, growing at the margin of the wet-mesic floodplain forest where it joins the shrub swamp/marsh community. MW is the only known site in northern Illinois for this species. Common woody vines included: trumpet creeper, *Menispermum canadense* L. (moonseed vine), *Smilax hispida* Muhl. (hispid greenbrier), and poison ivy. Herbaceous species included: *Arisaema dracontium* (L.) Schott (green dragon), *Cardamine bulbosa* (Schrab.) BSP. (creeping cress), *Lysimachia hybrida* Michaux (loosestrife), *Onoclea sensibilis* L. (sensitive fern), *Osmunda regalis* L. (regal fern), and *Polygonum virginianum* L. (Virginia knotweed). The floristic integrity was 36.25 for the site, while the mean C was 3.38 (Table 1). Seven species were encountered with a C greater than seven: *Ilex verticillata* (L.) Gray (winterberry), *Lycopus rubellus* Moench. (stalked water horehound), climbing hempweed, *Monotropa uniflora* L. (Indian pipe), regal fern, American storax, and *Viburnum acerifolium* L. (maple-leaved viburnum). Most of the species had a C from two to five. Eleven adventive species were included in calculating the FQI. If these species were excluded from the calculations the FQI of the site was 38.14 and the mean C was 3.74. This floodplain community had the highest FQI and C values at the MW. In general, an FQI greater than 35 is at sites that are regionally noteworthy (Taft, et al. 1997).

4. **Dry-mesic upland forest:** This community accounted for 14.8% or 31.2 ha (77.1 ac) of the MWLWR (Figure 3). The dry-mesic upland forest was characterized by large widely dispersed black oaks and a relatively dense understory dominated by *Prunus serotina* Ehrh. (black cherry). The tree diversity and total stems/ha was less than the other forested communities within

the MW study area while the understory saplings had the highest total stems/ha (Table 2 & Table 3). Common woody vines included: *Parthenocissus quinquefolia* (L.) Planch. (Virginia creeper), poison ivy, and *Vitis riparia* Michaux (riverbank grape). Herbaceous species included: *Anemonella thalictroides* (L.) Spach. (rue anemone), *Carex cephalophora* Muhl. ex Willd. (short-headed bracted sedge), *Carex pensylvanica* Lam. (Pennsylvania oak sedge), *Festuca obtusa* Biehler (nodding sedge), *Krigia biflora* (Walt.) Blake (false dandelion), *Polygonatum biflorum* (Walt.) Ell. (Solomon's seal), and *Solidago caesia* L. (woodland goldenrod). The floristic integrity was 30.84 for the site, while the mean C was 3.01 (Table 1). Only two species were encountered with a C greater than seven: *Carex swanii* (Fernald) Mackenzie (downy green sedge) and maple-leaved viburnum. Most of the species had a C from two to five. Thirteen adventive species were included in calculating the FQI. If these species were excluded from the calculations the FQI of the site was 32.90 and the mean C was 3.43.

5. **Wet-mesic prairie:** This community accounted for 0.2% or 0.4 ha (1.1 ac) of the MWLWR (Figure 3). This small wet-mesic prairie remnant is located along the northern edge of the MWLWR next to a railroad right-of-way. This community was characterized by the prominent prairie grasses and forbs. Species diversity was relatively high, 31 species recorded in the plots (Table 4). The prominent prairie grasses includeded: big bluestem, *Sorghastrum nutans* (L.) Nash (Indian grass), and *Spartina pectinata* Link (cord grass). The prominent forbs included downy sunflower, tall goldenrod, *Solidago rigida* L. (rigid goldenrod), and *Aster ericoides* L. (heath aster). The prominent shrub was Northern dewberry. Presently, the prairie is the subject of restoration activities. The floristic integrity was 37.06 for the site, while the mean C was

3.60 (Table 1). Only four species were encountered with a C greater than seven: *Carex bicknellii* Britton (Bicknell's sedge), *Carex buxbaumii* Wahlenb. (dark-scaled sedge), *Dalea candida* (Michaux) Willd. (white prairie clover), and *Prenanthes aspera* Michaux (rough white lettuce). Most of the species had a C from two to five. Six adventive species were included in calculating the FQI. If these species were excluded from the calculations the FQI of the site was 38.20 and the mean C was 3.82. This community had the highest FQI and mean C at the MW. In general, an FQI greater than 35 tends to be at sites that are regionally noteworthy (Taft, et al. 1997).

6. **Cultural:** This community accounted for 8.6% or 18.2 ha (44.9 ac) of the MWLWR (Figure 3). The cultural communities are created and maintained by human disturbance and were represented at the MWLWR by successional fields and developed lands (abandoned railroad right-of-way and road). A field adjacent to the wet-mesic prairie community was surveyed. Twenty-four species were recorded in plots (Table 5). Prominent prairie grasses included: big bluestem, Indian grass, and *Panicum virgatum* L. (switch grass), while common forbs included: tall goldenrod, *Euthamia graminifolia* (L.) Nutt. (grass-leaved goldenrod), *Potentilla simplex* Michaux (common cinquefoil), and *Hypericum sphaerocarpum* Michaux (round-leaved St. John's-wort). Presently, the successional field surveyed here is the subject of restoration activities. The floristic integrity of the entire cultural cultural community was 25.60, while the mean C was 1.93 (Table 1). No species were encountered with a C greater than seven. Most of the species had a C from two to five. Forty adventive species were included in calculating the FQI. If these species were excluded from the calculations the FQI of the site was 29.15 and the mean C was 2.50.

Quantitative vegetation analysis of the forest at MW and an analysis of the floristic integrity of the MWNP:

The overstory of the wet floodplain forest at the MWLWR contained seven tree species (three species were common) with a density of 369 stems/ha and basal area of 34.09 m^2/ha (Figure 3; Table 2). Silver maple dominated, was common in all diameter classes, had an average diameter of 39.5 cm, and an IV of 114.4. American elm , mostly restricted to the small diameter classes, had an average diameter of 19.6 cm, and ranked second with an IV of 43.7. Green/red ash, mostly occurring in the small diameter classes, had an average diameter of 26.9 cm, and ranked third with an IV of 39.6. Dead-standing individuals, most commonly American elm and silver maple, averaged 45 stems/ha with a basal area of 2.67 m^2/ha. The understory was very open with few saplings (170 stems/ha) present (Table 3). Numerous tree and shrub seedlings were encountered, an average of 97,100 stems/ha (Table 3). Nearly all tree and shrub seedlings were <10 cm tall and most may soon die due to dense shade and flooding.

Within the wet-mesic floodplain forest at the MWNP, the overstory contained eight tree species (five species were common) with a density of 388.7 stems/ha and basal area of 30.64 m^2/ha (Figure 2; Table 6). Silver maple dominated, was common in all diameter classes, had an average diameter of 27.2 cm, and an IV of 75.2. Other common species included: pin oak which ranked second with an IV of 53.7; green/red ash which ranked third with an IV of 27.4 and swamp white oak which ranked fourth with an IV of 20.3, as did American elm. An obvious feature of this community was the large number of dead-standing trees which averaged 56.5 stems/ha and had a basal area of 4.46 m^2/ha (Table 7). Tree seedlings were extremely common, averaged >1,000,000 stems/ha (Table 8) Nearly all tree seedlings were <10 cm tall and most would soon die

due to dense shade and flooding. As in the wet floodplain forest community, the understory was very open with few saplings, (276 stems/ha) present (Table 8).

Within the wet-mesic floodplain forest at the MWLWR, the overstory contained nine tree species (four species were common) with a density of 339 stems/ha and basal area of 26.58 m^2/ha (Figure 3; Table 2). Swamp white oak and pin oak dominated, were common in all diameter classes, had an average diameter of 38.2 cm and 30.1 cm respectively, and an IV of 56.3 and 48.7 respectively. Other common species, American elm, red/green ash, and silver maple, occurred mostly in the lower diameter classes and had average diameters near 20 cm dbh. Dead-standing individuals, most commonly American elm and swamp white oak, averaged 38 stems/ha with a basal area of 2.35 m^2/ha. Tree seedlings were numerous but less abundant than at the MWNP, an average of 76,200 stems/ha (Table 3). Nearly all tree seedlings were <10 cm tall. The understory was relatively dense with many small saplings, 2,950 stems/ha, with large numbers of spice bush, and a few other shrubs along with many saplings of red/green ash (Table 3).

The dry-mesic upland forest overstory contained five tree species (three species were common) with a density of 252 stems/ha and basal area of 22.29 m^2/ha (Figure 3; Table 2). Black oak dominated, was the most common in all but the two smallest diameter classes, had an average diameter of 47.2 cm, and an IV of 109 (Table 2). Other common species included white oak which ranked second with an IV of 53.9 and was common in the smaller diameter classes. Black cherry ranked third with an IV of 34.1 and dominated the 10 - 19 cm diameter class. Black cherry probably became common after grazing ceased and after earlier logging of the oaks released the cherry from shading. Dead-standing individuals averaged 7 stems/ha with a basal area of 1.14 m^2/ha. Black oaks were the only dead-standing individuals encountered. Tree

seedlings were common but less abundant than in the floodplain forest, an average of 28,200 stems/ha (Table 3). Nearly all tree seedlings were <10 cm tall. Seedlings of black oak, red/green ash, and black cherry were the most abundant. The understory was relatively dense with many saplings, 5,280 stems/ha. Black cherry dominated both the small and large saplings with 1,500 stems/ha and 2,070 stems/ha respectively (Table 3).

The floristic integrity of the MWNP was 32.68 for the site, while the mean C was 3.13 (Table 1). Only five species were encountered with a C greater than seven: Eastern mosquito fern, winterberry, stalked water horehound, climbing hempweed, and American storax. Most of the species had a C from two to five. Eleven adventive species were included in calculating the FQI. If these species were excluded from the calculations the FQI of the site was 34.45 and the mean C was 3.48. In general, an FQI greater than 35 denotes sites that are regionally noteworthy (Taft, et al. 1997). We consider MWNP, shrub swamp/marsh community, wet floodplain forest community, wet-mesic floodplain forest community, and wet-mesic prairie community as regionally noteworthy.

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MOMENCE WETLANDS, KANKAKEE COUNTY, ILLINOIS

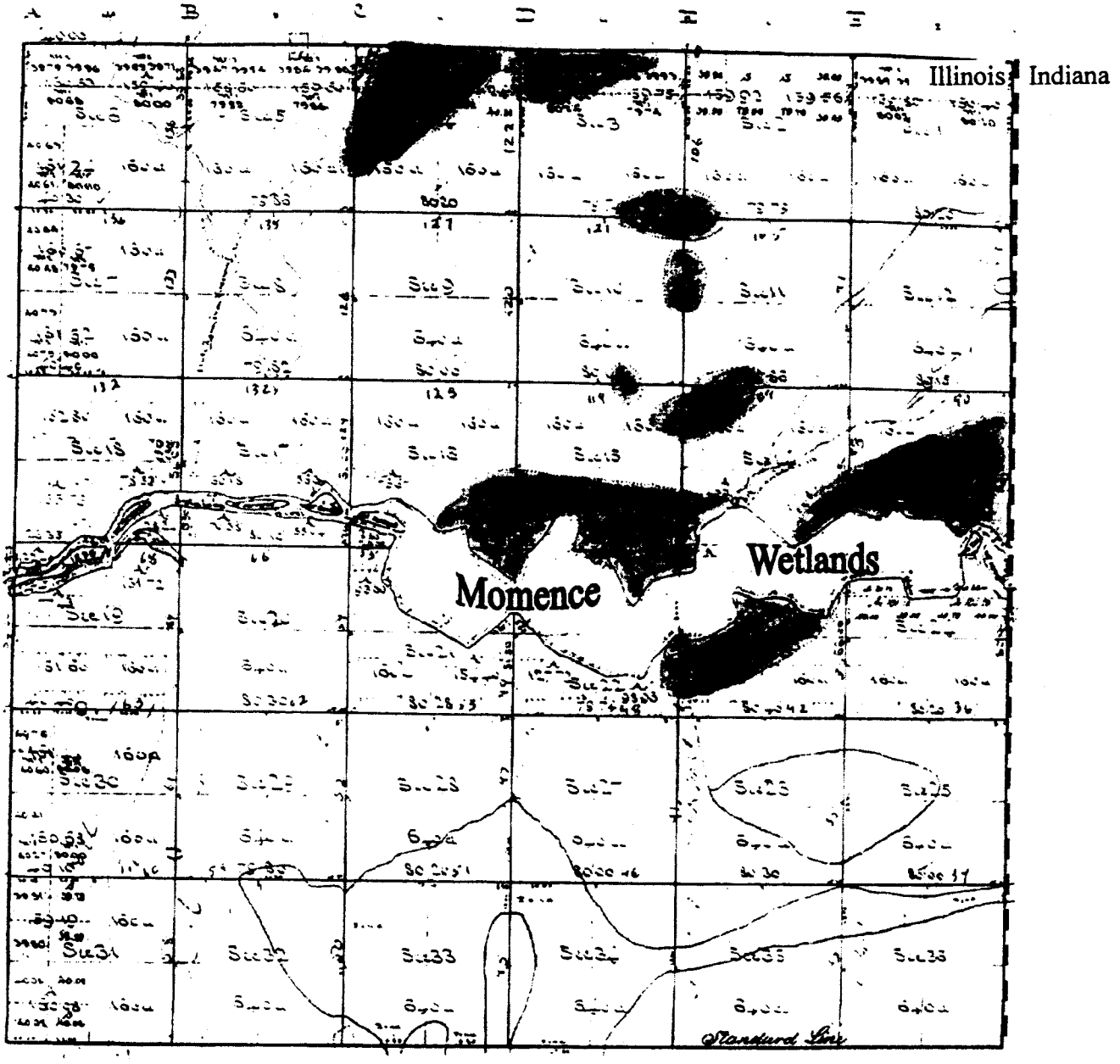

Figure 1. Spring 1834 pre-European settlement map of the Momence Wetlands along the Kankakee River, Kankakee County, Illinois. Gray shaded areas represent wooded sites, most likely oak savannas.

MOMENCE WETLANDS NATURE PRESERVE

(72 acres)

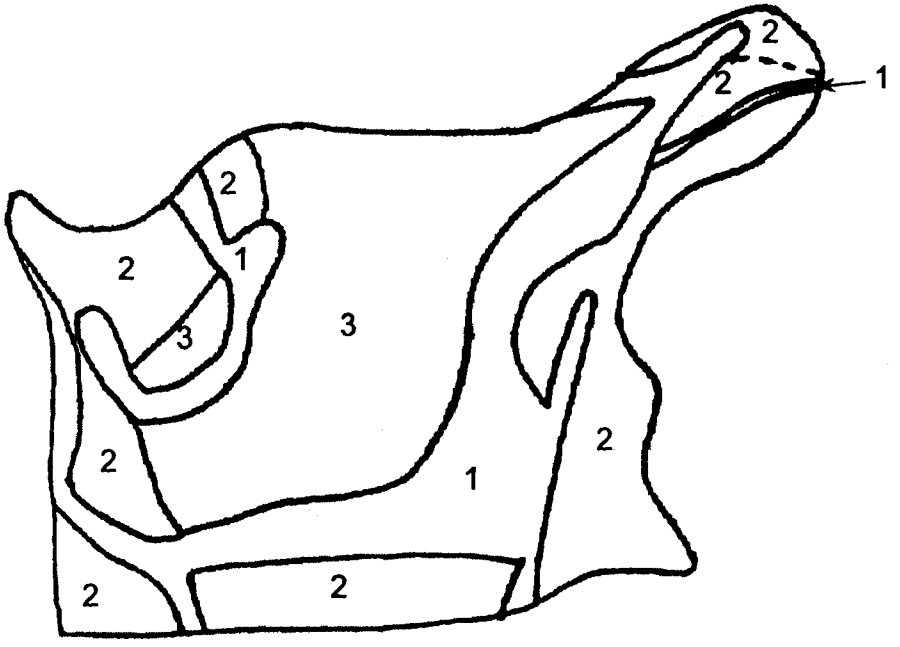

Figure 2. Natural communities of the Momence Wetlands Nature Preserve, Kankakee County, Illinois: (1) shrub swamp/marsh, (2) wet floodplain forest, and (3) wet-mesic floodplain forest.

MOMENCE WETLANDS LAND AND WATER RESERVE (519 acres)

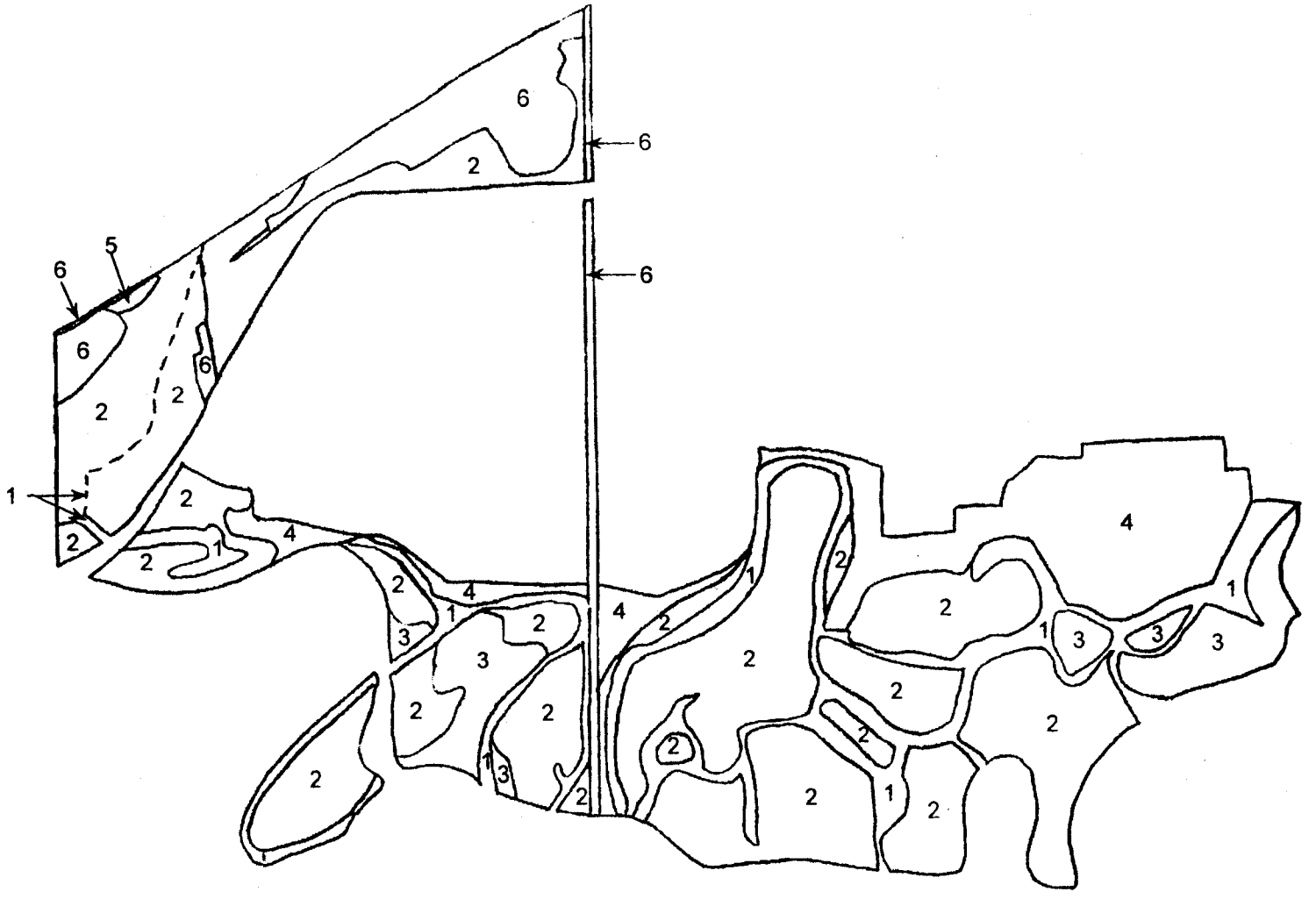

Figure 3. Natural communities of the Momence Wetlands Land and Water Reserve, Kankakee County, Illinois: (1) shrub swamp/marsh, (2) wet floodplain forest, (3) wet-mesic floodplain forest, (4) dry-mesic upland forest, (5) wet-mesic prairie, and (6) cultural.

Table 1. Floristic quality assessment summary data comparing six natural communities (1 = shrub swamp/marsh; 2 = wet floodplain forest; 3= wet-mesic floodplain forest; 4 = dry-mesic upland forest; 5 = wet-mesic prairie; 6 = cultural) at Momence Wetlands and the Momence Wetlands Nature Preserve (MWNP), Kankakee County, Illinois.

Parameter	1	2	3	4	5	6	NWNP
Total hectares	39.10	124.60	25.90	31.20	0.40	18.20	29.20
Total Species Richness	71.00	117.00	115.00	105.00	106.00	176.00	109.00
Native Species Richness	64.00	107.00	104.00	92.00	100.00	136.00	98.00
% Adventive	09.86	08.55	09.57	12.38	05.66	22.73	10.09
Floristic Quality Index (FQI)	25.95	30.83	36.25	30.84	37.06	25.60	32.68
FQI (native)	27.36	32.17	38.14	32.90	38.20	29.15	34.45
Mean Conservatism	03.08	02.85	03.38	03.01	03.60	01.93	03.13
Mean Conservatism (native)	03.42	03.11	03.74	03.43	03.82	02.50	03.48
# Rare Species (T & E)	00.00	00.00	01.00	00.00	00.00	00.00	01.00

Table 2. Densities (stems/ha), diameter classes, basal areas (m^2/ha), relative values, importance values, and average diameters of the woody species in three forest communities at the Momence Wetlands Land and Water Reserve, Kankakee County, Illinois.

Species	Diameter Classes (cm) 10 - 19	20 - 29	30 - 39	40 - 49	50 - 59	60 - 70	70+	Total stems/ha	Basal Area m^2/ha	Rel. Den.	Rel. Dom.	I.V.	Av. Diam. (cm)
Wet Floodplain Forest													
Silver Maple	11	45	48	23	9	14	12	162	24.04	43.9	70.5	114.4	39.5
American Elm	69	38	9	2	–	–	–	118	4.02	31.9	11.8	43.7	19.6
Red/Green Ash	25	28	20	12	1	–	–	86	5.57	23.3	16.3	39.6	26.9
Swamp White Oak	–	–	–	–	1	–	–	1	0.26	0.3	0.8	1.1	57.5
Cottonwood	–	–	–	1	–	–	–	1	0.16	0.3	0.5	0.8	44.5
River Birch	–	1	–	–	–	–	–	1	0.04	0.3	0.1	0.4	21.3
Totals	105	112	77	38	11	14	12	369	34.09	100.0	100.0	200.0	
Wet-mesic Floodplain Forest													
Swamp White Oak	13	13	11	14	8	5	4	68	9.62	20.1	36.2	56.3	38.2
Pin Oak	23	21	16	11	4	2	1	78	6.83	23.0	25.7	48.7	30.1
American Elm	32	26	7	2	2	–	–	69	3.06	20.4	11.5	31.9	21.9
Red/Green Ash	41	14	10	3	–	–	–	68	2.59	20.1	9.8	29.9	19.9
Silver Maple	19	3	2	2	2	–	–	28	1.39	8.3	5.2	13.5	21.4
River Birch	1	–	3	2	4	–	–	10	1.53	2.9	5.8	8.7	42.4
Bur Oak	–	1	2	1	1	1	1	7	1.28	2.0	4.8	6.8	46.0
Black Cherry	6	1	–	–	–	–	–	7	0.11	2.0	0.4	2.4	13.6
Red Oak	2	1	1	–	–	–	–	4	0.17	1.2	0.6	1.8	21.2
Totals	137	80	52	35	21	8	6	339	26.58	100.0	100.0	200.0	
Dry-mesic Upland Forest													
Black Oak	–	1	18	40	24	5	2	90	16.33	35.7	73.3	109.0	47.2
White Oak	21	39	17	5	–	–	–	82	4.77	32.5	21.4	53.9	25.9
Black Cherry	72	1	2	–	–	–	–	75	0.96	29.8	4.3	34.1	12.2
Red Oak	–	–	2	–	–	–	–	2	0.20	0.8	0.9	1.7	35.2
American Elm	3	–	–	–	–	–	–	3	0.03	1.2	0.1	1.3	10.6
Totals	96	41	39	45	24	5	2	252	22.29	100.0	100.0	200.0	

Table 3. Densities (stems/ha) of woody seedlings (<50 cm tall), small saplings (>50 cm tall <2.5 cm dbh), and large saplings (2.5 - 9.9 cm dbh) at three forest communities at Momence Wetlands Land and Water Reserve, Kankakee County, Illinois.

Species	Seedlings	Small Saplings	Large Saplings
Wet Floodplain Forest			
Red/Green Ash	67,000	--	25
Amercian Elm	15,600	--	30
Silver Maple	14,400	--	15
Pin Oak	100	--	--
White Mulberry	--	50	--
Buttonbush	--	50	--
Totals	97,100	100	70
Wet-mesic Floodplain Forest			
Red/Green Ash	21,700	800	205
American Elm	9,500	50	70
Silver Maple	700	--	60
Sassafras	100	--	5
Black Cherry	--	--	30
Pin Oak	--	--	30
River Birch	--	--	5
Swamp White Oak	--	--	5
Spicebush	41,700	1,400	--
Dogwood	1,600	--	--
Other shrubs	900	700	--
Totals	76,200	2,950	410
Dry-mesic Upland Forest			
Black Oak	13,100	500	5
Red/Green Ash	8,600	400	15
Black Cherry	2,800	1,500	2,070
White Oak	900	--	--
American Elm	700	100	55
Silver Maple	400	--	--
Sassafras	100	450	15
Shagbark Hickory	100	--	5
Other trees	--	150	15
Missouri Gooseberry	800	--	--
Black Haw	500	--	--
Japanese Barberry	200	--	--
Totals	28,200	3,100	2,180

Table 4. Frequency (%), average cover, relative frequency, relative cover, and importance value of the ground layer species encountered in a prairie remnant in the late summer of 1998 at the Momence Wetlands Land and Water Reserve, Kankakee County, Illinois

Species	Frequency %	Average Cover	Relative Frequency	Relative Cover	Importance Value
Rubus flagellaris	44.0	25.32	12.0	17.9	29.9
Helianthus mollis	38.0	26.40	10.3	18.6	28.9
Andropogon gerardii	34.0	19.32	9.3	13.6	22.9
Solidago canadensis	32.0	17.16	8.7	12.1	20.8
Poa pratensis	38.0	3.12	10.3	2.2	12.5
Solidago rigida	16.0	11.40	4.5	8.0	12.5
Aster ericoides	28.0	5.64	7.6	4.0	11.6
Sorghastrum nutans	16.0	8.64	4.5	6.0	10.5
Salix humilis	10.0	6.00	2.7	4.2	6.9
Rosa carolina	16.0	2.68	4.5	1.8	6.3
Eryngium yuccifolium	6.0	3.60	1.6	2.5	4.1
Euthamia graminifolia	12.0	1.04	3.3	0.7	4.0
Spartina pectinata	6.0	2.64	1.6	1.8	3.4
Potentilla simplex	8.0	1.32	2.2	0.9	3.1
Galium obtusum	10.0	0.20	2.7	0.1	2.8
Lactuca canadensis	6.0	1.48	1.6	1.0	2.6
Spiraea alba	6.0	1.48	1.6	1.0	2.6
Carex spp.	8.0	0.16	2.2	0.1	2.3
Euphorbia corollata	6.0	0.72	1.6	0.5	2.1
Hypericum sphaerocarpum	4.0	1.44	1.1	1.0	2.1
Ulmus americana	2.0	1.20	0.5	0.8	1.3
Elymus canadensis	4.0	0.08	1.1	0.1	1.2
Solidago nemoralis	2.0	0.24	0.5	0.2	0.7
Rudbeckia subtomentosa	2.0	0.24	0.5	0.2	0.7
Antennaria plantaginifolia	2.0	0.04	0.5	0.1	0.6
Achillea millefolium	2.0	0.04	0.5	0.1	0.6
Cassia fasciculata	2.0	0.04	0.5	0.1	0.6
Prunus serotina	2.0	0.04	0.5	0.1	0.6
Cirsium discolor	2.0	0.04	0.5	0.1	0.6
Muhlenbergia frondosa	2.0	0.04	0.5	0.1	0.6
Physostegia virginiana	2.0	0.04	0.5	0.1	0.6
Totals		141.80	100.0	100.0	200.0

Table 5. Frequency (%), average cover, relative frequency, relative cover, and importance value of the ground layer species encountered in a successional field in the late summer of 1998 at the Momence Wetlands Land and Water Reserve, Kankakee County, Illinois

Species	Frequency %	Average Cover	Relative Frequency	Relative Cover	Importance Value
Solidago canadensis	46.0	38.60	15.9	33.7	49.6
Rubus flagellaris	36.0	17.56	12.4	15.4	27.8
Andropogon gerardii	14.0	14.00	4.8	12.2	17.0
Poa pratensis	42.0	2.04	14.5	1.8	16.3
Euthamia graminifolia	14.0	4.36	4.8	3.8	8.6
Potentilla simplex	18.0	2.72	6.2	2.4	8.6
Sorghastrum nutans	10.0	6.00	3.4	5.2	8.6
Hypericum sphaerocarpum	16.0	2.48	5.5	2.2	7.7
Carex spp.	14.0	2.04	4.8	1.8	6.6
Panicum virgatum	8.0	3.84	2.8	3.4	6.2
Anemone canadensis	10.0	3.12	3.4	2.7	6.1
Stachys tenuifolia	12.0	1.80	4.1	1.6	5.7
Galium obtusum	14.0	0.28	4.8	0.3	5.1
Helianthus grosseseratus	6.0	2.64	2.1	2.3	4.4
Rosa carolina	6.0	1.68	2.1	1.5	3.6
Rudbeckia subtomentosa	4.0	2.40	1.4	2.1	3.5
Geum laciniatum	4.0	2.40	1.4	2.1	3.5
Panicum lanuginosum	4.0	1.24	1.4	1.1	2.5
Aster lanceolatus	2.0	1.20	0.7	1.0	1.7
Muhlenbergia mesicana	2.0	1.20	0.7	1.0	1.7
Eryngium yuccifolium	2.0	1.20	0.7	1.0	1.7
Rosa setigera	2.0	1.20	0.7	1.0	1.7
Ulmus americana	2.0	0.24	0.7	0.2	0.9
Cornus sp.	2.0	0.24	0.7	0.2	0.9
Totals		114.48	100.0	100.0	200.0

Table 6. Densities (stems/ha), diameter classes, basal areas (m^2/ha), relative values, importance values and average diameters of woody species in the wet-mesic floodplain forest at Momence Wetlands Nature Preserve, Kankakee County, Illinois.

Species	Diameter Classes (cm) 10 - 19	20 - 29	30 - 39	40 - 49	50 - 59	60 - 70	70+	Total stems/ha	Basal Area m^2/ha	Rel. Den.	Rel. Dom.	I.V.	Av. Diam. (cm)
Silver Maple	67.5	30.4	19.2	9.0	4.2	3.8	7.0	141.1	11.94	36.2	39.0	75.2	27.2
Pin Oak	13.4	22.4	17.6	12.8	9.3	3.5	3.2	82.2	9.95	21.2	32.5	53.7	35.7
Red/Green Ash	23.4	27.2	11.2	2.9	–	0.3	–	65.0	3.28	16.7	10.7	27.4	23.9
Swamp White Oak	20.5	8.0	6.1	3.2	1.3	1.3	0.9	41.3	2.98	10.6	9.7	20.3	26.2
American Elm	30.4	18.3	5.1	0.6	–	–	–	54.4	1.92	14.0	6.3	20.3	19.9
River Birch	1.0	0.6	1.6	0.3	–	0.3	–	3.8	0.34	1.0	1.1	2.1	31.0
Honey Locust	–	–	–	0.6	–	–	–	0.6	0.10	0.2	0.3	0.5	44.5
Cottonwood	–	–	–	–	–	–	0.3	0.3	0.13	0.1	0.4	0.5	73.0
Totals	156.2	106.9	60.8	29.4	14.8	9.2	11.4	388.7	30.64	100.0	100.0	200.0	

Table 7. Density, basal area, and average diameter of the dead-standing tree species encountered in the wet-mesic floodplain forest at Momence Wetlands Nature Preserve, Kankakee County, Illinois.

Species	Density (stems/ha)	Basal Area (m^2ha)	Average Diameter (cm)
American Elm	23.0	1.30	23.7
Pin Oak	12.2	1.28	31.4
Silver Maple	10.6	1.32	33.3
Red/Green Ash	4.5	0.09	15.1
River Birch	4.2	0.40	34.1
Swamp White Oak	2.0	0.07	18.1
Totals	56.5	4.46	

Table 8. Densities (stems/ha) of woody seedlings (<50 cm tall), small saplings (>50 cm tall <2.5 cm dbh), and large saplings (2.5 - 9.9 cm dbh) in the wet-mesic floodplain forest at Momence Wetlands Nature Preserve, Kankakee County, Illinois.

Species	Seedlings	Small Saplings	Large Saplings
American Elm	720,000	--	28
Red/Green Ash	324,500	50	10
Silver Maple	177,500	50	113
Pin Oak	500	--	--
White Mulberry	500	--	--
Buttonbush	8,000	25	--
Totals	1,231,000	125	151

APPENDIX 1

The vascular taxa encountered and collected at the Momence Wetlands are listed below by major groups, Pteridophytes (ferns and fern-allies) and Spermatophytes (seed plants), the latter divided into Monocots and Dicots. The families, genera, and species are alphabetically arranged within each group. Non-native species are indicated by an asterisk (*). After the binomial and authority, the communities where the species was observed is given (1 = shrub swamp/marsh, 2 = wet floodplain forest, 3 = wet-mesic floodplain forest, 4 = dry-mesic upland forest, 5 = wet-mesic prairie, 6 = cultural). Following the community number(s), collecting numbers preceded by the initial of the collector's name are given (P for Loy R. Phillippe, H for Fran Harty).

PTERIDOPHYTES

DRYOPTERIDACEAE

Onoclea sensibilis L.: 3; P 30042

EQUISETACEAE

Equisetum arvense L.: 6; P 30395

OPHIOGLOSSACEAE

Botrychium dissectum Spreng.: 4, 5, 6; P 29958

OSMUNDACEAE

Osmunda regalis L.: 3; P 30041

SALVINIACEAE

Azolla caroliniana Willd.: 1, 2; P 29928

THELYPTERIDACEAE

Thelypteris palustris Schott var. *pubescens* (Lawson) Fernald: 3; P 30960

SPERMATOPHYTES: ANGIOSPERMS

MONOCOTS

ALISMACEAE

Alisma plantago-aquatica L. var. *parviflorum* (Pursh) Torrey: 1, 2; P 29907
Sagittaria brevirostrata Mack. & Bush: 1, 2; P 30968, P 31227
Sagittaria latifolia Willd.: 1, 2; P 30050

ARACEAE

Arisaema dracontium (L.) Schott: 3; P 30373

COMMELINACEAE

**Commelina communis* L.: 4; P 30030
Tradescantia ohiensis Raf.: 5, 6; P 29996

CYPERACEAE

Carex bicknellii Britton: 5; P 30337
Carex blanda Dewey: 3, 4; P 30369, P 30403
Carex buxbaumii Wahlenb.: 5; P 30348
Carex cephalophora Muhl. ex. Willd.: 4; P 30367
Carex festucacea Schk. in Willd.: 4; P 30409
Carex lupulina Willd.: 2, 3, 4; P 30089
Carex muskingumensis Schwein.: 2, 3, 4; P 30037
Carex normalis Mackenzie: 3, 4; P 30143, P 30364
Carex pellita Muhl.: 5; P 30339
Carex pensylvanica Lam.: 4; P 30159
Carex radiata (Wahlenberg) Small: 3, 4; P 30375
Carex sartwellii Dewey: 6; P 30352
Carex stipata Muhl. in Willd.: 6; P 30390
Carex stricta Lam.: 5, 6; P 30351, P 30396
Carex swanii (Fernald) Mackenzie: 4; P 30407
Carex tribuloides Wahlenb.: 4; 30017
Carex typhina Michaux: 3, 4; P 30015, P 30078
Cyperus aristatus Rottb.: 1; P 29882
Cyperus erythrorhizos Muhl.: 1, 2; P 30053, P 31361
Cyperus ferruginescens Boeckl.: 1, 2, 3; P 29880
Cyperus strigosus L.: 5, 6; P 31246
Eleocharis acicularis (L.) Roem. & Schultes: 1, 2; P 30969
Eleocharis elliptica Kunth var. *compressa* (Sull.) Drap. & Mohlenbrock: 5; P 30349
Eleocharis obtusa (Willd.) Shult. var. *obtusa*: 1, 2; P 29883
Hemicarpha micrantha (Vahl) Pax: 1; P 29881
Scirpus cyperinus (L.) Kunth: 6; P 31250

DIOSCOREACEAE

Dioscorea villosa L.: 3, 4, 6; P 30120

IRIDACEAE

Iris shrevei Small: 3; P 31228
Sisyrinchium albidum Raf.: 5; P 30347

JUNCACEAE

Juncus tenuis Willd.: 4, 5; P 30966

LEMNACEAE

Lemna minor L.: 1; P 31012

LILIACEAE

Allium canadense L.: 4, 5, 6; P 30345
Hypoxis hirsuta (L.) Coville:5; P 30350
**Ornithogalum umbellatum* L.: 6; P 30382
Polygonatum biflorum (Walt.) Ell.: 4; P 30405

POACEAE

**Agrostis alba* L.: 2, 5, 6; P 31008
Agrostis hyemalis (Walt.) BSP.: 6; site record only
Agrostis perennans (Walt.) Tuckerm.: 4; P 30020
Andropogon gerardii Vitman: 5, 6; P 29977
Andropogon virginicus L.: 6; P 30136
**Bromus tectorum* L.: 6; P 30357
Calamagrostis canadensis (Michaux) Beauv.: 6; P 30990
Cinna arundinacea L.: 2, 3, 4; P 30036
**Dactylis glomerata* L.: 4, 6; P 30404
**Digitaria ischaemum* (Schreb.) Muhl.: 3; P 30116
**Digitaria sanguinalis* (L.) Scop.: 3; P 30142
Echinochloa muricata (P. Beauv.) Fernald var. *muricata*: 1, 2, 6; P 30054, P 31249, P 31272
Elymus canadensis L.: 5; P 30001
Elymus virginicus L.: 2, 3, 4, 5, 6; P 30007
Eragrostis hypnoides (Lam.) BSP.: 1, 2; P 29912
Eragrostis pectinacea (Michaux) Nees: 1, 2; P 30983
Eragrostis spectabilis (Pursh) Steud.: 5; P 29986
Festuca obtusa Biehler: 4; P 30363
Glyceria striata (Lam.) Hitchcock: 1, 2, 3, 6; P 30401
Leersia lenticularis Michaux: 2, 3; P 29924
Leersia oryzoides (L.) Swartz: 1, 2; P 29909
Leersia virginica Willd.: 1, 2, 3, 4, 6; P 29923
Leptoloma cognatum (Schult.) Chase: 6; P 30131
Muhlenbergia frondosa (Poir.) Fernald f. *frondosa*: 2, 4; P 30055, P 30088
Muhlenbergia mexicana (L.) Trin. f. *mexicana*: 5, 6; P 29965
Muhlenbergia schreberi Gmel.: 4; P 30026
Panicum capillare L. var. *capillare*: 2; P 31362
Panicum clandestinum L.: 4, 6; P 30961
Panicum dichotomiflorum Michaux: 1, 2, 3, 6; P 29915
Panicum lanuginosum Elliott var. *fasciculatum* (Torrey) Fernald: 4, 5 6; P 29978, P 30091

Panicum lanuginosum Elliott var. *lindheimeri* (Nash) Fernald: 5, 6; P 29971
Panicum latifolium L.: 4; P 30092
Panicum virgatum L.: 5, 6; P 29974
Phalaris arundinacea L.: 2, 3, 6; P 30978
**Poa annua* L.: 6; P 30154
**Poa pratensis* L.: 4, 5, 6; P 30341, P 30361
Schizachyrium scoparium (Michaux) Nash: 5; P 29992
Setaria geniculata (Lam.) Beauv.: 5; P 31006
Sorghastrum nutans (L.) Nash: 5, 6; P 30011
Spartina pectinata Link: 5; P 29991
Sphenopholis obtusata (Michaux) Scribner var. *major* (Torrey) Erdman: 4, 6; P 30368
Sporobolus asper (Michaux) Kunth: 6; P 30137
Stipa spartea Trin.: 5; P 31005-B
Tridens flavus (L.) Hitchcock: 6; P 30122

POTAMOGETONACEAE

**Potamogeton crispus* L.: 1; P 30046

SMILACACEAE

Smilax ecirrhata Kunth: 2, 3; P 30399
Smilax hispida Muhl.: 3, 4; P 30039

SPARGANIACEAE

Sparganium sp.: 1; site record only

DICOTS

ACEREACEAE

Acer negundo L.: 6; P 30167
Acer saccharinum L.: 1, 2, 3, 4, 6; P 30152

AMARANTHACEAE

Amaranthus rudis Sauer: 1, 2, 3; P 29878, P 30064

ANACARDIACEAE

Toxicodendron radicans (L.) Kuntze: 2, 3, 4, 6; P 30985, P 31224

APIACEAE

Cicuta maculata L.: 5; P 30995
Cryptotaenia canadensis (L.) DC.: 6; P 30986
**Daucus carota* L.: 5, 6; P 29985
Eryngium yuccifolium Michaux: 5, 6; P 29959
Osmorhiza claytonii (Michaux) Clarke: 4, 6; P 30408
**Pastinaca sativa* L.: 6; P 30379
Sanicula canadensis L.: 4, 6; P 30964
Sium suave Walt.: 1, 2; P 29946
Thaspium barbinode (Michaux) Nuttall: 6; P 30387
**Torilis japonica* (Houtt.) DC.: 4, 6; P 30965

APOCYNACEAE

Apocynum cannabiunum L.: 4; P 31230

AQUIFOLIACEAE

Ilex verticillata (L.) Gray: 3; P 29937, P 31264

ASCLEPIADACEAE

Asclepias incarnata L.: 1, 2, 3, 5; P 29932, P 30149, P 30998
Asclepias syriaca L.: 6; site record only

ASTERACEAE

**Achillea millefolium* L.: 5, 6; P 31010
Ambrosia artemisiifolia L.: 5, 6; P 31266
Ambrosia trifida L.: 2, 5, 6; P 30013
Antennaria plantaginifolia (L.) Richardson: 4, 5; P 30371
**Arctium lappula* L.: 6; P 31245
**Arctium minus* Bernh.: 2, 6; site record only
Aster drummondii Lindley in Hooker: 5; P 29981
Aster dumosus L.: 2, 4; P 30102-A
Aster ericoides L.: 5; P 30012
Aster lanceolatus Willd.: 1, 2, 3, 5, 6; P 29893, P 30060, P 30101
Aster ontarionis Wieg.: 1, 2, 4; P 30087, P 30102-B, P 31270

Aster pilosus Willd.: 5, 6; P 29955
Aster urophyllus Lindley in DC.: 4; P 30019
Bidens aristosa (Michaux) Britton: 2, 3, 5, 6; P 29917
Bidens cernua L.: 1, 2; P 29910
Bidens frondosa L.: 1, 2, 3; P 29918
Bidens vulgata Greene: 1, 2, 3; P 31274
**Centaurea maculosa* Lam.: 6; P 30989
**Cirsium arvense* (L.) Scop.: 6; site record only
Cirsium discolor (Muhl.) Spreng.: 5, 6; P 31253
Conyza canadensis (L.) Cronquist: 6; P 31252
Eclipta prostrata (L.) L.: 1, 2; P 29914
Erechtites hieracifolia (L.) Raf.: 2, 3; P 29890
Erigeron annuus (L.) Pers.: 4, 6; P 31238
Eupatorium altissimum L.: 6; P 30125
Eupatorium maculatum L.: 2, 3; P 29887, P 30976
Eupatorium perfoliatum L.: 2; P 30106
Eupatorium rugosum Houtt.: 4; P 30033
Eupatorium serotinum Michaux: 1, 2, 3, 4, 5, 6; P 29921
Euthamia graminifolia (L.) Nutt.: 5, 6; P 29966
Gnaphalium obtusifolium L.: 6; P 30123
Helenium autumnale L.: 5, 6; P 30005
Helianthus grosseserratus Martens: 5, 6; P 29968
Helianthus mollis Lam.: 5; P 30003
Helianthus strumosus L.: 6; P 30980
Heliopsis helianthoides (L.) Sweet: 6; P 30133
Krigia biflora (Walt.) Blake: 4; P 30362
Lactuca biennis (Moench) Fernald: 2, 6; P 31241
Lactuca canadensis L.: 5, 6; P 29953
Liatris spicata (L.) Willd.: 5; P 30004
Mikania scandens (L.) Willd.: 1, 2, 3; P 29916
Prenanthes altissima L.: 4; P 30021
Prenanthes aspera Michaux: 5; P 29987
Ratibida pinnata (Vent.) Barnh.: 5; P 30999
Rudbeckia hirta L.: 5; P 31011
Rudbeckia laciniata L.: 2; P 31239
Rudbeckia subtomentosa Pursh: 5, 6; P 29954
Senecio glabellus Poir.: 2, 6; P 30377
Solidago canadensis L.: 5, 6; P 29967
Solidago caesia L.: 4; P 30090
Solidago gigantea Aiton: 2, 6; P 30104
Solidago nemoralis Aiton; 5; P 29984
Solidago rigida L.: 5; P 29999
Solidago ulmifolia Muhl.: 4; P 30024
**Sonchus arvensis* L.: 6; P 30993
**Taraxacum officinale* Weber: 6; P 30169
**Tragopogon dubius* Scop.: 6; P 30355
Vernonia fasciculata Michaux: 6; P 30008
Xanthium strumarium L. var. *glabratum* (DC.) Cronq.: 2; P 30048

BALSAMINACEAE

Impatiens capensis Meerb.: 1, 2, 3, 4, 6; P 30982

BERBERIDACEAE

**Berberis thunbergii* DC.: 3, 4, 6; P 30025, P 30162

BETULACEAE

Betula nigra L.: 1, 2, 3; P 30062, P 30398

BIGNONIACEAE

Campsis radicans (L.) Seem: 2, 3, 4, 6; P 30972
Catalpa speciosa Warder: 2, 4, 6; P 30144

BORAGINACEAE

Hackelia virginiana (L.) I.M. Johnston: 4, 6; P 30963
**Myosotis scorpioides* L.: 1; P 30098
Myosotis verna Nutt.: 6; P 30388

BRASSICACEAE

**Alliaria petiolata* (Bieb.) Cavara & Grande: 4; P 30360
**Barbarea vulgaris* R. Br.: 6; P 30354-B
Cardamine bulbosa (Schrab.) BSP.: 3; P 30376
Cardamine pensylvanica Muhl.: 3, 5, 6; P 30045
Descurainia pinnata (Walt.) Britton: 6; P 30385
**Erysimum inconspicuum* (S. Wats.) MacM.: 6; P 30359
**Lepidium campestre* (L.) R. Br.: 6; P 30356
**Nasturtium officinale* R. Br.: 1, 2; P 30397
Rorippa islandica (Oeder) Borbas var. *fernaldiana* Butt. & Abbe: 2; P 29904
Rorippa sessiliflora (Nutt.) Hitchc.: 2; P 29884
**Rorippa sylvestris* (L.) Besser: 1, 2; P 30984
Sibara virginica (L.) Rollins: 6; P 30157

CAESALPINIACEAE

Cassia fasciculata Michaux: 5, 6; P 30010
Gleditsia triacanthos L.: 3; P 30150

CAMPANULACEAE

Campanula americana L.: 6; P 30103
Lobelia cardinalis L.: 1, 2, 3; P 29941, P 30070

CAPRIFOLIACEAE

**Lonicera x bella* Zabel: 4; P 30365
**Lonicera maackii* (Rupr.) Maxim.: 4, 6; P 30093, P 30394
Sambucus canadensis L.: 4, 6; P 31240
Viburnum acerifolium L.: 3, 4; P 29938, P 30406
**Viburnum lantana* L.: 5; P 29994

CARYOPHYLLACEAE

**Arenaria serpyllifolia* L.: 6; P 30383
Cerastium nutans Raf.: 6; P 30392
**Cerastium vulgatum* L.: 6; P 30353, P 30380
**Lychnis alba* Mill: 6: P 29950
Moehringia lateriflora (L.) Fenzl.: 4; P 30366
**Myosoton aquaticum* (L.) Moench.: 1; P 30107
Paronychia canadensis (L.) Wood: 4; P 31229
**Saponaria officinalis* L.: 6; P 30130
Silene antirrhina L.: 6; P 30384
Silene stellata (L.) Aiton f.: 4; P 30022
**Stellaria media* (L.) Vill.: 6; P 30155

CELASTRACEAE

Celastrus scandens L.: 4; P 30410
Euonymus atropurpurea Jacq.: 3; P 30040

CHENOPODIACEAE

Chenopodium standleyanum Aellen: 4; P 30032

CLUSIACEAE

Hypericum sphaerocarpum Michaux: 5, 6; 29962

CONVOLVULACEAE

Calystegia sepium (L.) R. Br.: 2, 3, 5, 6; P 31001

CORNACEAE

Cornus obliqua Raf.: 2, 3, 4, 5, 6; P 30086
Cornus racemosa Lam.: 6; P 31248

CUCURBITACEAE

Echinocystis lobata (Michaux) Torrey & Gray: 2, 3; P 29889
Sicyos angulatus L.: 1, 2, 3; P 30044

CUSCUTACEAE

Cuscuta gronovii Willd.: 1, 2, 3; P 29949, P 31263

ELAEAGNACEAE

**Elaeagnus umbellata* Thunb.: 4; P 30099

EUPHORBIACEAE

Acalypha gracilens Gray var. *gracilens*: 6; P 30134
Acalypha rhomboidea Raf.: 2, 3, 4, 6; P 29934, P 30066
Euphorbia corollata L.: 5; P 31009
Poinsettia dentata (Michaux) Kl. & Garcke: 6; P 30124

FABACEAE

Amorpha fruticosa L.: 4; P 30083
Apios americana Medicus: 5; P 30996
Baptisia lactea (Raf.) Thieret: 5; P 29990
Dalea candida (Michaux) Willd.: 5; P 29989
Desmodium glabellum (Michaux) DC.: 5, 6; P 29960
Desmodium illinoense Gray: 5; P 29998
Desmodium nudiflorum (L.) DC.: 4; P 30016
Lathyrus palustris L.: 5; P 29983
Lespedeza capitata Michaux: 5; P 30000
**Melilotus alba* Medicus: 5, 6; P 31002

FAGACEAE

Quercus alba L.: 4; P 31237
Quercus bicolor Willd.: 2, 3; P 29935
Quercus macrocarpa Michaux: 3; P 31269
Quercus palustris Muenchh.: 1, 2, 3,; P 30082
Quercus rubra Lam.: 4; P 31233
Quercus velutina Lam.: 4; P 30095

GENTIANACEAE

Gentiana andrewsii Griseb.: 5, 6; P 29969

GERANIACEAE

Geranium carolinianum L.: 6; P 30358
Geranium maculatum L.: 3, 4; P 30370

GROSSULARIACEAE

Ribes americana Mill.: 3, 6; P 30153, P 31254
Ribes missouriense Nutt.: 3, 4; P 30161

JUGLANDACEAE

Carya ovata (Mill.) K. Koch: 3, 4; P 31232

LAMIACEAE

**Glechoma hederacea* L.: 4, 6; P 30170
**Leonurus cardiaca* L.: 6; P 31244
Lycopus americanus Muhl.: 3, 5; P 29885
Lycopus rubellus Moench.: 3; P 29886
Lycopus uniflorus Michaux: 1, 2, 3; P 30077, P 30097
Lycopus virginicus L.: 3; P 31267
Mentha arvensis L. var. *villosa* (Benth.) S.R. Stewart: 1, 6; P 31000, P 31271
Mimulus ringens L.: 2; P 29903
**Nepetea cataria* L.: 6; P 30139
Physostegia speciosa (Sweet) Sweet: 2, 3, 5; P 29945, P 30112
Physostegia virginiana (L.) Benth.: 1, 2, 3, 5; P 29896, P 31273
Prunella vulgaris L.: 4, 5, 6; P 29957
Pycnanthemum pilosum Nutt.: 5; P 31007
Pycnanthemum tenuifolium Schrad.: 5; P 29997
Scutellaria lateriflora L.: 1, 2, 3; P 29901
Stachys tenuifolia Willd. var.*hispida* (Pursh) Fernald: 2, 3, 5, 6; P 30014, P 31005-A
Stachys tenuifolia Willd. var. *tenuifolia*: 2, 6; P 29900
Teucrium canadense L.: 3, 6; P 30038

LAURACEAE

Lindera benzoin (L.) Blume: 3, 4; P 29940
Sassafras albidum (Nutt.) Nees: 3, 4, P 30075

LYTHRACEAE

Ammannia coccinea Rottb.: 3; P 29891
Lythrum alatum Pursh: 5; P 31004
**Lythrum salicaria* L.: 1; P 29888
Rotala ramosior (L.) Koehne: 1, 2; P 29908

MALVACEAE

Hibiscus laevis All.: 1, 2; P 29931

MENISPERMACEAE

Menispermum canadense L.: 2, 3; P 30374

MORACEAE

**Morus alba* L.: 2, 3, 4, 6; P 30132

NYCTAGINACEAE

**Mirabilis nyctaginea* (Michaux) MacM.: 6; P 29951

OLEACEAE

Fraxinus pennsylvanica Marsh.: 1, 2, 3; P 29930, P 29948, P 30049, P 30059, P 30061
Fraxinus profunda (Bush) Bush: 1; H s.n.

ONAGRACEAE

Gaura biennis L.: 6; P 31251
Ludwigia palustris (L.) Ell.: 1, 2; P 29898
Oenothera biennis L.;:5, 6; P 29982
Oenothera pilosella Raf.: 5; P 30997

OXALIDACEAE

Oxalis dillenii Jacq.: 2, 3, 6; P 30126
Oxalis stricta L.: 3, 4, 6; P 30018, P 30148
Oxalis violacea L.: 5; P 30344

PHYTOLACCACEAE

Phytolacca americana L.: 1, 2, 3, 4, 6; P 30034

PLANTAGINACEAE

**Plantago major* L.: 3; P 29895
Plantago rugelii Decne.: 6; P 30987
Plantago virginica L.: 6; P 30389

POLEMONIACEAE

Phlox paniculata L.: 6; P 31243

POLYGALACEAE

Polygala sanguinea L.: 5; P 30002

POLYGONACEAE

Polygonum amphibium L.: 1, 2, 3, 6; site record only
Polygonum bicorne Raf.: 3; P 30114
**Polygonum cespitosum* Blume var. *longisetum* (De Bruyn) Stewart: 2, 3, 4, 6; P 30029
Polygonum hydropiperoides Michaux: 1, 2; P 29927
Polygonum lapathifolium L.: 1; site record only
Polygonum pensylvanicum L.: 3; P 29922, P 30141
**Polygonum persicaria* L.: 2, 3; P 29925, P 31261
Polygonum punctatum Ell.: 1, 2, 3, 5, 6; P 29902, P 31247, P 31260
Polygonum scandens L.: 4, 5, 6; P 30031
Polygonum virginianum L.: 2, 3, 4, 6; P 30023
**Rumex acetosella* L.: 6; P 30386
Rumex altissimus Wood: 6; P 30994
**Rumex crispus* L.: 2; P 30977
Rumex verticillatus L.: 1, 2; P 29929

PORTULACACEAE

Claytonia virginica L.: 4, 5, 6; P 30168

PRIMULACEAE

Lysimachia ciliata L.: 3; P 30962
Lysimachia hybrida Michaux: 3; P 31255
Lysimachia lanceolata Walt.: 4, 5; P 31003
**Lysimachia nummularia* L.: 1, 2, 3, 6; P 30068
Samolus valerandii L.: 1; P 30975

PYROLACEAE

Monotropa uniflora L.: 3; P 31266

RANUNCULACEAE

Anemone canadensis L.: 5, 6; P 30340
Anemone virginiana L.: 6; P 30988
Anemonella thalictroides (L.) Spach.: 4; P 30158
Clematis pitcheri Torrey & Gray: 3; P 30080
Myosurus minimus L.: 6; P 30156
Ranunculus abortivus L.: 5, 6; P 30165
Ranunculus sceleratus L.: 1, 2; P 29905
Ranunculus septentrionalis Poir.: 3; P 30163
Thalictrum revolutum DC.: 5; P 29980

RHAMNACEAE

**Rhamnus cathartica* L.: 3; P 30121

ROSACEAE

Crataegus cuneiformis (Marsh.) Egglest.: 3; P 30083
Crataegus mollis (Torrey & Gray) Scheele: 2, 3; P 30100
Fragaria virginiana Duchesne: 3, 6; P 30381
Geum canadense Jacq.: 4, 6; P 30035, P 30138
Geum laciniatum Murr.: 5, 6; P 29970
Geum vernum (Raf.) Torrey & Gray: 6; P 30393
Malus ioensis (Wood) Britton: 3; P 30402
Potentilla norvegica L.: 2, 6; P 30135
Potentilla simplex Michaux: 4, 5; P 30338
Prunus serotina Ehrh.: 3, 4, 5, 6; P 31234
Rosa carolina L.: 5, 6; P 29952
**Rosa multiflora* Thunb.: 4, 5, 6; 29963
Rosa setigera Michaux: 2, 3, 6; P 31265
Rubus allegheniensis Porter: 4; P 31236
Rubus flagellaris Willd.: 2, 4, 5, 6; P 31235
Rubus occidentalis L.: 2, 3, 4, 6; P 30971
Rubus pensilvanicus Poiret: 2, 3, 4, 6; P 30372
Spirea alba Du Roi: 5; P 29988

RUBIACEAE

Cephalanthus occidentalis L.: 1, 2, 3; P 30058, P 30072
Galium aparine L.: 4, 6; site record only
Galium obtusum Bigel.: 4, 5, 6; P 30009
Galium triflorum Michaux: 4; P 30028
Hedyotis caerulea (L.) Hook.: 5; P 30342

RUTACEAE

Zanthoxylum americanum Mill.: 3, 4; P 30084, P 30160

SALICACEAE

Populus deltoides Marsh.: 1, 2, 6; P 30378
Populus heterophylla L.: 1; P 29939
Salix exigua Nutt.: 2, 6; P 30105
Salix humilis Marsh.: 5; P 29993
Salix nigra Marsh.: 1, 2; P 30047
Salix rigida Muhl.: 6; P 30118

SAURURACEAE

Saururus cernuus L.: 1, 2, 3; P 30052

SAXIFRAGACEAE

Penthorum sedoides L.: 1, 2; P 29920

SCROPHULARIACEAE

Gratiola neglecta Torrey: 2, 6; P 30147, P 30991
**Linaria vulgaris* Hill: 6; P 30127
Lindernia dubia (L.) Pennell var. *anagallidea* (Michaux) Cooperrider: 1, 2; P 29913
Mimulus ringens L.: 1, 2, P 29903
**Verbascum thapsus* L.: 6; P 30992
**Veronica arvensis* L.: 6; P 30354-A
Veronica catenata Pennell: 1, 2; P 30056, P 30974
Veronicastrum virginicum (L.) Farw.: 5, 6; P 29975

SOLANACEAE

Physalis heterophylla Nees: 5, 6; P 30129
Solanum carolinense L.: 5, 6; P 29972
**Solanum dulcamara* L.: 2, 3; P 29892
Solanum ptycanthum Dunal: 2, 3; P 29911

STYRACACEAE

Styrax americana Lam.: 3; P 29936, P 30140

ULMACEAE

Celtis occidentalis L.: 3; P 30081
Ulmus americana L.: 2, 3, 4, 6; P 30057, P 30151, P 30166
Ulmus rubra Muhl.: 3, 4; P 30074

URTICACEAE

Boehmeria cylindrica (L.) Sw.: 2, 3, 5, 6; P 29897, P 31262
Laportea canadensis (L.) Wedd.: 2, 3; P 30079
Parietaria pensylvanica Muhl.: 3; site record only
Pilea pumila (L.) Gray: 1, 2, 3; P 29899, P 30109
Urtica dioica L.: 2, 4; P 30027

VERBENACEAE

Phyla lanceolata (Michaux) Greene: 1, 2; P 29919
Verbena hastata L.: 6; P 29956
Verbena stricta Vent.: 6; P 30128
Verbena urticifolia L.: 6; P 30981, P 31242

VIOLACEAE

Viola pranticola Greene: 3, 6; P 30076, P 30146
Viola sagittata Aiton: 4, 5; P 30343

VITACEAE

Parthenocissus quinquefolia (L.) Planch.: 3, 4, 6; P 31231
Vitis riparia Michaux: 2, 3, 4, 5, 6; P 29961, P 30400